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The Cattle-Beef Subsector in the United States

A Brief Overview

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THE CATTLE-BEEF SUBSECTOR IN THE UNITED STATES: A BRIEF OVERVIEW. By Kenneth E. Nelson, National Economics Division, Economic Research Service, U.S. Department of Agriculture. Washington, D. C. February 1984. ERS Staff Report No. AGES 840106.

ABSTRACT

This report gives a brief overview of the U.S. cattle-beef subsector. Brief descriptions of the types of operations and activities that occur in producing beef, as well as some statistics on costs, production, and consumption of beef and beef's position relative to other commodities are presented. The institutions, pricing mechanisms, methods of vertical coordination, and importance of international trade in meat are also discussed.

Keywords: Cattle, beef, cattle feeding, beef subsector, vertical coordination, beef consumption, beef production, meat imports, meat exports.

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SUMMARY

Beef is the most important meat in the American consumer's budget, whether measured by quantity consumed, money expenditures, or nutrition. Each person consumed an average of 79 pounds of beef, 62 pounds of pork, and 52 pounds of broilers in 1983, and consumers spent $52 billion for domestically grown beef and veal out of a total of $86.8 billion for all domestic meat products in 1982.

The cattle-beef subsector is the largest in U.S. agriculture. Farmers realized nearly $30 billion in cash receipts from marketing cattle and calves in 1982. This was 73 percent of cash receipts from the sale of meat animals and larger than the value of any single crop commodity.

The beef subsector involves four major groups: farmers and ranchers who raise and grow beef cattle and calves; cattlefeeders who finish cattle; slaughterer/processors who convert live animals to dressed meat and meat products; and merchants who sell beef to consumers. Moving meat from producers to consumers also involves transportation firms, livestock market operators, meat processors, wholesalers, graders, inspectors, and many more. The system's performance is affected by thousands of individual decisions, the information available for making decisions, and the competitive conditions under which decisions are made. The sequential stages of the system are largely independent of one another and are coordinated by a series of market transactions with prices determined by supply and demand at each level.

INTRODUCTION

This report provides a brief description of the cattle-beef industry in the United States. It provides general information to those not familiar with the industry and answers questions frequently asked about it. The report includes brief descriptions of the types of operations and activities that occur in producing beef, as well as some statistics on costs, production, and consumption of beef. Beef's position relative to other commodities is discussed. The institutions, pricing mechanisms, methods of vertical coordination, and importance of international trade in meat are also discussed.

CATTLE RAISING

Many years ago meat and milk came from the same cattle. Specialization and improvements in the efficiency of milk production have reduced dramatically the number of cows needed for milk production. Now the only link between dairy and beef is that cull dairy stock ends up in the supply chain as vealers, feeder calves, or hamburger beef. Beef cattle raising is distinct and separate.

Producers in the first stage of the cattle-beef chain raise some calves to slaughter weight but most grow calves to a weight and age suitable for finishing in the feedlot. Ownership of cattle-raising operations is generally separate from later stages and calves may move from one cattle-raising operation to another before reaching the feedlot. Beef calves come from 20-cow herds on bluegrass pasture in Kentucky, 1,000-cow herds on Montana range, 50-cow herds using crop residues on Iowa corn farms, and hundreds of other types.

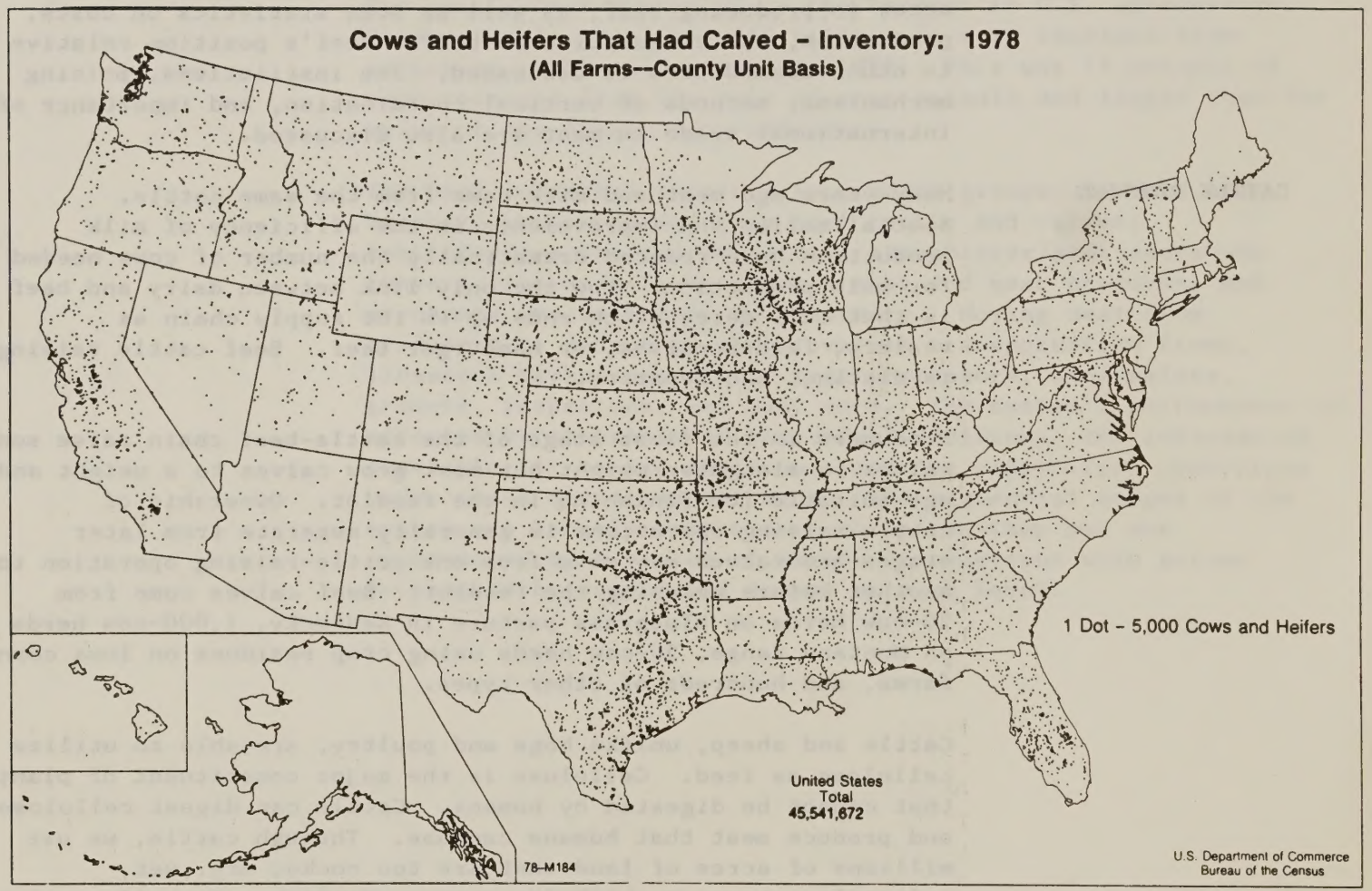
Cattle and sheep, unlike hogs and poultry, are able to utilize cellulose as feed. Cellulose is the major constituent of plants that cannot be digested by humans. Cattle can digest cellulose and produce meat that humans can use. Through cattle, we use millions of acres of land that are too rocky, dry, wet, infertile, steep, or high for crop production. Over 83 percent of all cattle feed is from roughages and less than 17 percent from concentrates such as corn (19).1/

Beef cattle are raised on numerous relatively small operations. The average herd size is about 34 head. While there is a trend toward fewer but larger operations, many small herds remain. In 1978, 58 percent of the more than 1 million farms reporting beef cows had fewer than 20 head but accounted for only 14 percent of all beef cows. Less than 3 percent of the farms with herds of more than 200 head accounted for 30 percent of the cows. Seven percent of beef cows were in herds of 1,000 cows or more (17).

Farm and ranch cattle-raising operations exist in significant numbers in all regions and climates (fig. 1). Roughly half the cows are located in the eastern part of the Great Plains, Iowa, Missouri, and Arkansas.

1/ Numbers in parentheses refer to references listed at the end of the report.

Figure 1


Cows and Heifers That Had Calved - Inventory: 1978
(All Farms--County Unit Basis)
1 Dot - 5,000 Cows and Heifers
United States
Total
45,541,672
78-M184
U.S. Department of Commerce
Bureau of the Census

Land for grazing the beef cow herd, with accompanying breeding stock, and some harvested roughages are the primary inputs for cattle raising. Investments are high and land-appreciation rates and interest rates affect producers' well-being. Inputs used in cattle raising include:

- o 1.0 million farms and ranches (1978);
- o 39.3 million beef cows (1982);
- o 587 million acres of grassland pasture (all species, 1978);
- o 172 million acres of grazed forest land (all species, 1978);
- o 11.6 million metric tons of concentrate feed (1982);
- o 61.7 million metric tons of hay (1980);
- o 61.9 million metric tons of other harvested roughage (1980) (6, 7, 12, 17).

About 9 calves are produced from 10 cows in 1 year and some of these are needed for herd replacement, so only 0.7 or 0.8 calves per cow are available for sale each year. This compares to about 15 pigs per sow and 250-300 broilers per breeding hen. In addition, a female beef animal is much older than other species when producing her first offspring. Thus, beef producers cannot increase or decrease output as rapidly as other livestock producers.

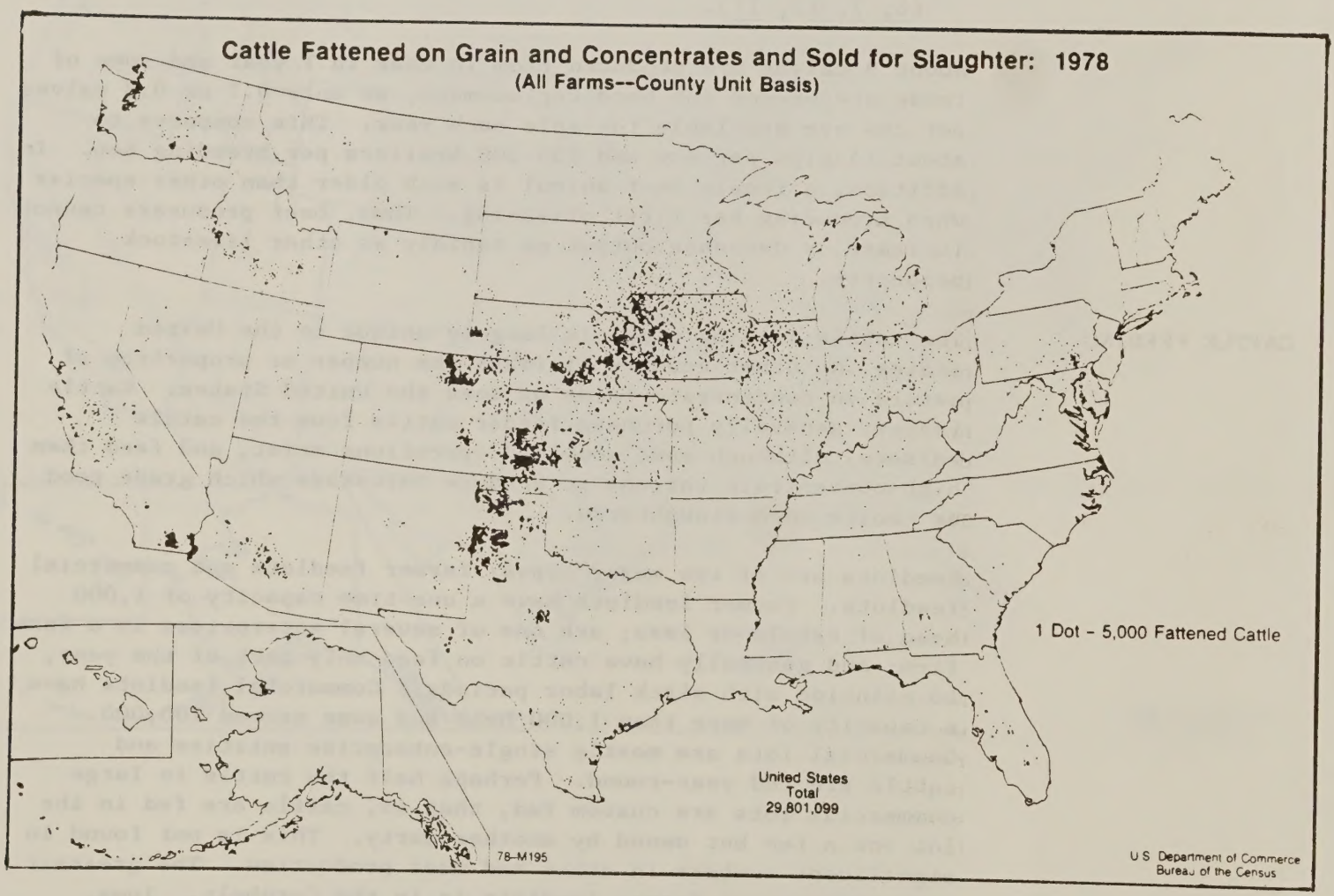
CATTLE FEEDING

The cattle feeding stage is largely unique to the United States. No other country finishes the number or proportion of cattle on concentrate feeds as does the United States. Cattle feeders generally purchase feeder cattle from the cattle raisers, although some combined operations exist, and feed them high-concentrate rations to produce carcasses which grade good or choice when slaughtered.

Feedlots are of two major types: farmer feedlots and commercial feedlots. Farmer feedlots have a one-time capacity of 1,000 head of cattle or less; are one of several enterprises in a farm firm; and generally have cattle on feed only part of the year, to coincide with slack labor periods. Commercial feedlots have a capacity of more than 1,000 head and some exceed 100,000. Commercial lots are mostly single-enterprise entities and cattle are fed year-round. Perhaps half the cattle in large commercial lots are custom fed, that is, cattle are fed in the lot for a fee but owned by another party. This is not found in significant numbers in other red meat production. The greatest concentration of farmer feedlots is in the Cornbelt. Iowa, Nebraska, and Illinois had the largest number in 1981. The trend has been toward large commercial feedlots which developed in the western Corn Belt and High Plains during the sixties and seventies to take advantage of lower feed grain prices and warmer, drier winters (fig. 2).

All 104,409 feedlots in the 23 major cattle feeding States marketed about 23 million head of fed cattle in 1981. Most of the lots (98 percent) were farmer feedlots, but most of the cattle (73 percent) came from commercial lots. About 40 percent of the cattle were marketed from 210 lots with a capacity of 16,000 head or more (14).

Figure 2


Cattle Fattened on Grain and Concentrates and Sold for Slaughter: 1978
(All Farms--County Unit Basis)
1 Dot - 5,000 Fattened Cattle
United States
Total
29,801,099
78-M195
U S Department of Commerce
Bureau of the Census

Unlike cattle raising, little land is required for the cattle feeding operation. The major investments are a feeding facility, a feed storage facility, and feed processing and delivery equipment. Major operating costs are for feeder cattle and feed.

Feeder calves are generally purchased (or sometimes raised) at 1 year or more of age, weighing 500 to 750 pounds. Approximately 9 to 11 pounds of corn-equivalent ration are required for each pound of liveweight gain in the feedlot. Antibiotics and growth promotants are widely used, increasing the rate of gain by about 7-8 percent and improving feed efficiency by about 6-7 percent. A typical steer gains between 2 and 3 pounds per day, so from 4 months to over a year, depending on a calf's incoming weight, are required to finish a heifer or steer to a market weight of 900 to 1,200 pounds.

The role of feed grains in beef production is often misunderstood. Cattle on feed use more corn equivalents per pound of gain (11 to 1) than do hogs (5 to 1), or broilers (3 to 1); however, hogs and broilers, including breeding stock, consume practically 100 percent concentrates throughout their lives. Concentrate feeding of cattle takes place almost entirely during the finishing stage and amounts to less than 2 pounds per live pound of cattle produced (19). The use of concentrates for finishing increases the efficiency of production by increasing the rate of gain and lowering the nonfeed costs of gain. Feeding also improves meat quality by delivering younger and better marbled beef to slaughter.

BEEF PACKING AND PROCESSING

The third stage in the movement of beef products is cattle slaughter. Cattle slaughterers kill purchased cattle, hang, dress, and chill the carcass and, to an increasing degree, many further cut the carcass into smaller pieces for transport in boxes.

Ninety-four percent of the 36 million cattle slaughtered in 1982 were slaughtered in 1,506 federally inspected (FI) plants. The remainder were slaughtered in 4,037 smaller plants under other types of equivalent inspection. About 85 percent of FI slaughter was in 134 large plants slaughtering 50,000 or more head a year (8). The largest, most modern plants are capable of slaughtering over 1 million cattle annually.

Over the past several decades, meatpacking has moved away from multistory, multispecie plants near terminal markets. The shift has been toward fewer but larger, single-story, specialized plants located farther west, nearer supplies of fed cattle.

The most dramatic, and relatively recent, development in beef packing is boxed beef. Twenty years ago, nearly all beef left the packer as forequarters and hindquarters. Now, more than half is fabricated (cut-up) into primal or subprimal cuts by the packer, sealed in vacuum-pack bags, and shipped out in cardboard boxes.

The advantages of boxed beef include:

- o economies of size in assembly line techniques;
- o less fat and bone shipped;
- o allows buyer to order specific cuts;
- o product shrinkage is reduced;
- o increases shelf life of product;
- o fat and bone can be more efficiently salvaged;
- o product can be shipped and stored in less space.

By far the largest expense for beef packers is cattle: 89 percent of cost and profit in 1981. About half of the remainder was for wages and benefits; supplies and containers were the next most significant expense (1).

DISTRIBUTION

The final stage moves beef from the packer to outlets, where consumers can buy it. Most transportation is by refrigerated truck. Retail outlets are conveniently divided into two general classifications: retail food stores, and the hotel, restaurant, and institutional (HRI) trade. The largest amount of beef is sold through retail food stores but the food service industry market has been growing rapidly, especially fast-food restaurants.

Many large retail chains have their own central cutting facilities and therefore buy quarters directly from packers. Others maintain central warehouse facilities for handling boxed beef (or quarters) purchased from packers. Some beef is delivered directly to the store by the packer. One-half or more of the beef leaves the packer in boxes and as much as 90 percent reaches large chain stores as fabricated beef. The majority passes through a company-owned warehouse (table 1).

Large food service firms often buy like large retail chains. Some have their own processing facilities and some have contractual or other long-term formal coordinating devices to ensure a steady flow of hamburger or other specific products needed by a fast-food chain.

Many smaller food stores and HRI outlets need the services of third-party wholesale suppliers or market intermediaries, and there are many in the business. Brokers do not take title to meat but execute sales for a commission; jobbers buy and sell meat on their own account, as do purveyors who specialize in a particular type of clientele such as expensive hotels. Meat processors further cut meat, blend ingredients, and make luncheon meats. In 1977, there were 1,345 prepared-meat plants; 4,443 merchant wholesalers of meat; 435 manufacturers' sales

Table 1--Tonnage of fresh and frozen beef received by 346 major retailers in 1979, and estimates for 1980 and 1983

Item	1979	Estimates 1980	Estimates 1983
		Percent	
Source:			
Direct from meatpackers (includes slaughter/fabrications)	39	38	34
Own or group-owned central cutting fabrication facility	18	17	17
Own or group-owned meat warehouse (no fabrication)	36	39	46
Breakers/purveyors (includes some fabrication)	6	6	3
Other	1	-	-
Form:			
Sides, hindquarters, and forequarters	14	13	8
Primals (loins, ribs, rounds, chucks)	29	27	23
Bone-in subprimals	18	18	19
Boneless subprimals	21	23	28
Beef for grinding	17	18	20
Consumer-size retail cuts	1	1	2

-=less than 0.5 percent.
Source: Meat Industry, May 1981, p. 48.

branches and offices; and 247 agents, brokers, and commission merchants in the United States, all selling meat (18).

BEEF CONSUMPTION

The average person consumed 79 pounds of beef, 62 pounds of pork, and 52 pounds of broilers (all retail weight) in 1983 (NED, ERS data). Beef consumption was at a cyclical low in 1980, down from a peak of 94 pounds per capita in 1976, when cattle slaughter was very large due to a rapid liquidation of the cow herd.

The overall trend in beef production and per capita consumption has been upward since before 1960, with a drop-off in recent years. Pork consumption has cycled around 60 pounds per capita for two decades. Chicken consumption has increased in most years (fig. 3).

Increases in the consumption of other meats have offset decreases in beef consumption since 1976, so total red meat and poultry consumption has remained relatively constant since 1976. Increased supplies of these beef substitutes coupled with a sluggish economy, have tempered price rises for beef.

Consumers spent $52 billion (estimated) for domestic beef and veal in 1982. This was 17 percent of expenditures for domestic farm-produced foods and 60 percent of expenditures for domestically produced meat products (13). Consumers spent approximately 2 percent of their disposable income for beef in 1981 (15). This figure has declined since 1976, along with expenditures for all foods. The average retail price of choice beef was $2.425 per pound in 1982, a record level in current dollars, but lower than in all years since 1950, except for 1956 and 1977, after correcting for inflation. The retail price of beef declined slightly in 1983 (table 2).

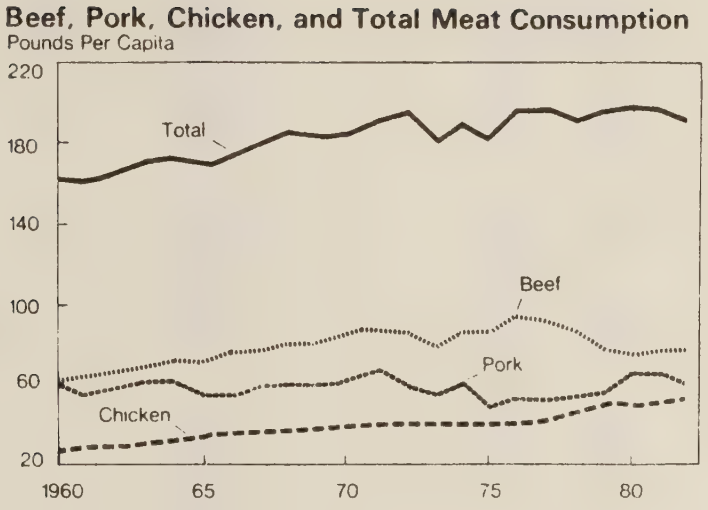
Prices for beef and pork increased more than prices for poultry between 1960 and 1983. Beef and veal increased 200 percent; pork 219 percent; and poultry only 84 percent. A striking comparison is the ratio of beef to pork and beef to chicken prices. Beef cost twice as much per pound as chicken in 1960 but more than three times as much in 1982 (table 3). The larger increase for beef reflects the higher cost of producing beef and partially explains the rapid increase in poultry consumption in recent decades.

THE CATTLE CYCLE

A distinguishing feature of the livestock-meat economy is the cattle cycle, a persistent, repetitious pattern of increases and decreases in cattle numbers (fig. 4). Prices for cattle and meat also fluctuate cyclically but inversely to cattle numbers and with turning points occurring at various times.

The cattle cycle occurs because of the biological lag in production, and the effects of production decisions in reaction to many economic forces. There is no beginning to the cycle, but for exposition we start with the expansion phase. Attractive prices for calves induce producers to hold back heifers for breeding that otherwise would be marketed. Also,

Figure 3



Source: (13)

Table 2--Retail price of choice beef, 1950-82

Year	Consumer price index (1967 = 100)	Retail price of beef	
		Current	Deflated by consumer price index
		Cents/pound	
1950	72.1	76.4	105.9
1951	77.8	89.4	114.9
1952	79.5	87.8	110.4
1953	80.1	70.0	87.3
1954	80.5	69.4	86.2
1955	80.2	68.4	85.2
1956	81.4	67.0	82.3
1957	84.3	71.6	84.9
1958	86.6	82.1	94.8
1959	87.3	84.0	96.2
1960	88.7	82.1	92.5
1961	89.6	80.3	89.6
1962	90.6	83.6	92.2
1963	91.7	80.4	87.6
1964	92.9	78.4	84.3
1965	94.5	82.0	86.7
1966	97.2	84.4	86.8
1967	100.0	84.6	84.6
1968	104.2	88.7	85.1
1969	109.8	98.6	89.8
1970	116.3	101.7	87.4
1971	121.3	108.1	89.1
1972	125.3	118.7	94.7
1973	133.1	142.1	106.7
1974	147.7	146.3	99.0
1975	161.2	154.8	96.0
1976	170.5	148.2	86.9
1977	181.5	148.4	81.7
1978	195.4	181.9	93.0
1979	217.4	226.3	104.0
1980	246.8	237.6	96.2
1981	272.4	238.7	87.6
1982	289.1	242.5	83.8
1983	298.4	238.1	79.8

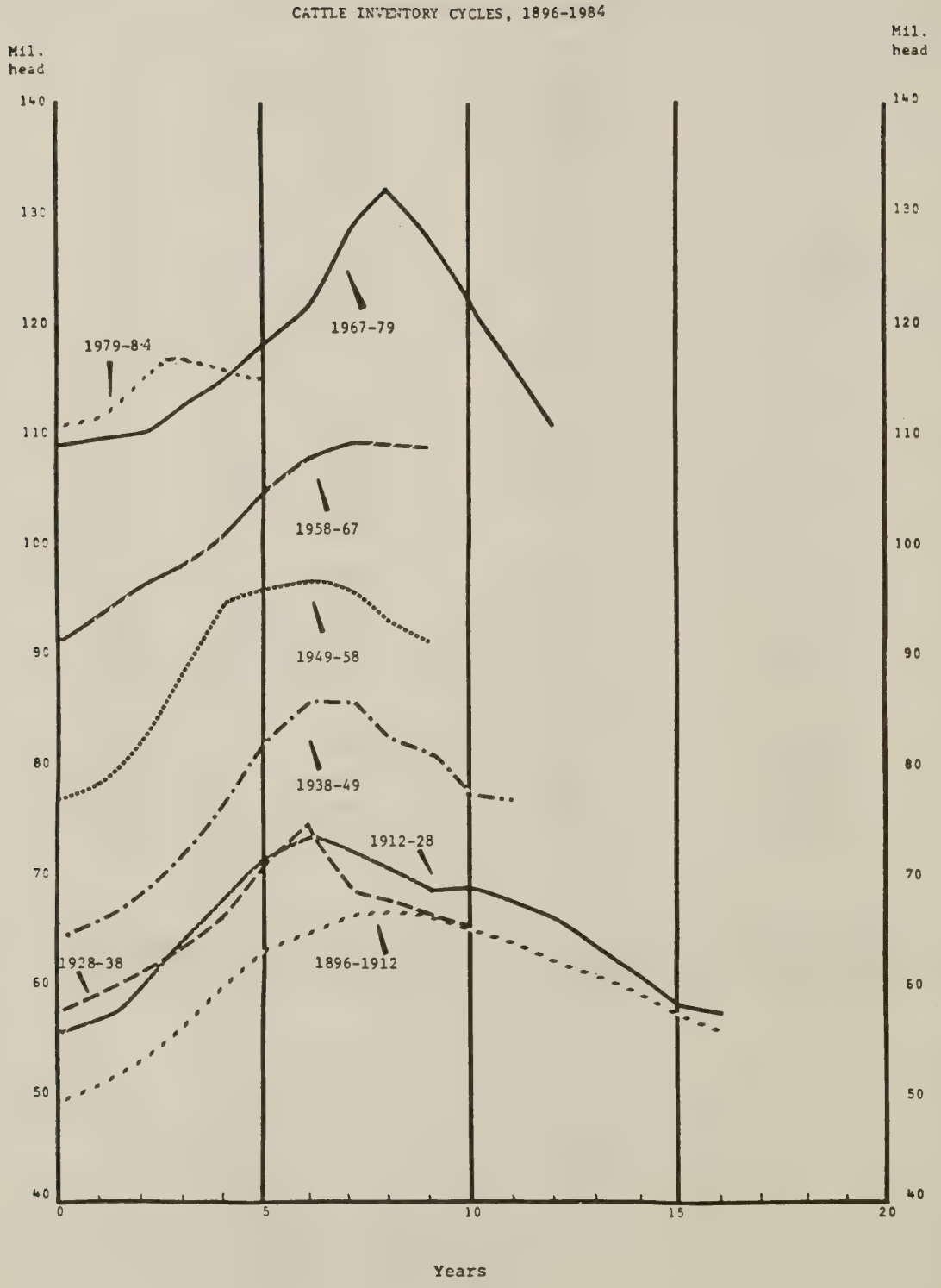
Source: Animal Products Branch, NED, ERS, USDA.

Table 3--Consumer price indexes for poultry, beef and veal, and pork and retail price ratios for beef-pork and beef-chicken, 1960-82

Year	Price index (1967 = 100)			Price ratios	
	Poultry	Beef & veal	Pork	Beef-pork	Beef-chicken
1960	106.9	92.1	81.7	1.48	1.94
1961	96.5	90.6	85.5	1.39	2.10
1962	102.0	93.9	86.3	1.43	2.06
1963	100.4	92.8	84.1	1.44	2.02
1964	98.2	90.1	83.7	1.42	2.03
1965	101.2	94.4	95.3	1.26	2.07
1966	106.7	99.4	109.0	1.15	2.03
1967	100.0	100.0	100.0	1.27	2.19
1968	103.1	104.1	100.2	1.33	2.17
1969	109.0	114.5	109.1	1.34	2.27
1970	108.4	119.5	115.9	1.31	2.44
1971	109.0	124.9	105.0	1.55	2.57
1972	110.4	136.6	121.6	1.44	2.79
1973	154.8	163.8	161.7	1.30	2.34
1974	146.9	168.5	161.0	1.36	2.57
1975	162.4	170.0	196.9	1.15	2.41
1976	155.7	164.5	199.5	1.11	2.43
1977	156.7	163.6	188.8	1.18	2.40
1978	172.9	201.0	213.1	1.27	2.74
1979	181.5	255.8	216.4	1.57	3.34
1980	190.8	270.3	209.1	1.70	3.30
1981	198.6	272.6	228.6	1.57	3.24
1982	195.1	276.5	258.1	1.38	3.39
1983	197.5	272.3	255.8	1.40	3.27

Source: Indexes for 1960-82 from (13), 1983 from NED, ERS, USDA data. Retail price ratios calculated from NED, ERS, USDA data.

Figure 4


CATTLE INVENTORY CYCLES, 1896-1984
Mil. head
Mil. head
140
130
120
110
100
90
80
70
60
50
40
1979-84
1967-79
1958-67
1949-58
1938-49
1912-28
1928-38
1896-1912
0
5
10
15
20
Years

more cattle that might go quickly to slaughter as non-feds are placed in feedlots. Thus, slaughter is reduced and current supplies of beef are smaller. This further raises beef and cattle prices, stimulating herd expansion even more. Due to the biological lag in beef production, it may take 3-1/2 to 5-1/2 years before the expanded supply of beef begins to reach consumers. But, cattle numbers become so large that increased slaughter is inevitable, beef supplies increase, and prices fall. If producers rush to liquidate herds, the market is glutted and prices drop severely. The herd eventually contracts, marketings drop, prices begin to rise, and the process begins anew.

In addition to the internal factors of prices and inventories, cattle cycles may be affected by combinations of external factors including weather, feed prices, consumer income and expenditures, inflation, and consumer preferences.

Throughout the seventies many of these outside factors combined negatively for the beef industry. High inflation, increased grain and energy costs, price ceilings, a consumer boycott, and a severe drought in 1975 contributed to the 16-percent decline in cattle numbers from 1975 to 1979.

EXCHANGE

Cattle and calves are usually bought and sold for immediate slaughter, further grazing, or placement in feedlots or breeding herds. There are four basic channels which a farmer, rancher, or cattle feeder may use to sell his livestock.

Terminal markets. Farmers may transport livestock to 1 of the 28 remaining livestock terminal markets, most of which are located in the seven west north-central States. There, a firm negotiates the sale for a commission. The seller pays yardage, feed, and handling charges.

Terminals peaked in importance during the twenties and thirties when many packing plants were located near livestock markets. About 80 terminal markets sold over 90 percent of the cattle and calves purchased by packers. This figure is now less than 10 percent.

Auctions. Cattle or calves may also be transported to auction markets, where the price is established through open bidding by the public. In 1980, there were 1,832 posted auctions, compared with 2,472 in 1949, and 2,065 in 1960. About 40 million cattle and calves were marketed through auctions in 1980.

Auctions are found in all parts of the United States, roughly in proportion to livestock density, with an especially high use of auctions in the Mountain, Pacific, and Southern regions. A 1976 survey indicated that over 80 percent of cow-calf operators used auctions to sell some of their cull cows and/or feeder calves (2). In general, auctions are most important for the sale of slaughter cows and bulls (52 percent in 1980) (16).

Other sales through an agent. Country commission firms, order buyers, and bargaining associations are intermediaries through which a farmer may sell livestock, often from the farm without transporting them to an assembly yard. Country commission firms and bargaining associations act as agents for sellers, while order buyers act as agents for buyers. Country commission firms are prominent in some areas in the sale of slaughter cattle by farmer feeders. Order buyers are most often used by cattle feeders to purchase feeder cattle which are at a distance from the feedlot.

Direct sales. Many cattle are sold directly by private treaty from the farmer to packer buyers, country dealers, order buyers, country buying stations, local markets, or other producers. Many producers wish to keep cattle on the farm until they are sold to reduce shrinkage and transportation costs, and to reduce their commitment to a sale until all terms are negotiated.

Direct sales, country dealers, etc., have become by far the most important exchange outlet for slaughter steers and heifers, accounting for 87 percent of sales to packers in 1980. Direct sales are used almost exclusively by the large commercial feed lots in the Southern Plains and west north-central regions (16).

Prices for all feeder cattle and most slaughter cattle are on a liveweight basis. The buyer makes a visual appraisal of the relative desirability of the livestock and bids or negotiates the price accordingly.

An important minority of slaughter cattle are purchased on a carcass grade and weight basis. This is sometimes known as selling on the rail or in the meat. The price is determined when the animal is slaughtered and the weight, quality grade, and sometimes yield grade are known. The price is established from a predetermined scale of prices for carcass weights and grades.

In 1980, 29 percent of U.S. steers and heifers, 25 percent of cows and bulls, and 20 percent of calves were purchased by packers on a carcass grade and weight basis. On the rail sales were most important for steers and heifers in the west north-central States at 53 percent. Only 6 percent of the steers and heifers in the two Southern Plains States were sold by this method (16).

Wholesale. Most wholesale beef is purchased by description over the telephone. Pricing is divided into two general categories: formula and negotiated. In most formula-priced transactions, buyer and seller negotiate a formula that includes a specified differential from a particular reported price (usually the Yellow Sheet, a daily private price reporting publication) for a particular product on a given date close to the shipping date. Thus, buyer and seller agree on the quantity and description of the product and the formula, but the actual

transaction price is unknown to both parties until later. A formula may be unique to a single transaction or may apply to standing orders over a period of time.

Negotiated sales are like most private treaty transactions: price, product, and other terms of the trade are negotiated at the same time. A variation frequently used by some large buyers is offer and acceptance pricing. The buyer receives offers at a specified price from a number of suppliers. The buyer selects from the range of offers and notifies sellers which offers are accepted. Some items may be price-listed by a packer with listed prices good for a specified length of time.

Most carcass sales from packer to retailer (70-80 percent) are formula priced, while most boxed-beef sales (80-90 percent) are negotiated. An exception is some boxed-beef programs in which an entire carcass is purchased in boxes; these are frequently formula priced.

Pricing systems in sales to the HRI trade by packers or intermediaries are varied. Sales to institutions (schools, prisons, military) are typically based on suppliers' bids; hotel and restaurant purchases of ground beef are primarily formula priced. Profit-targeting, long-term contracts, and long-term negotiated fixed prices from packers who cross hedge in the futures market also exist.

Formula pricing has been a controversial issue in the beef industry. Concerns have been expressed about the erosion in the negotiated price base used for formula pricing. Critics of formula pricing cite incentives for price manipulation and potential perpetuation of inappropriate price patterns.

Several potential advantages for formula pricing include:

- formula pricing facilitates long-standing supplier-customer relationships;
- the buyer feels protected from paying more than competitors; and
- the operational efficiency of low search and transaction costs.

Formula pricing is not as widely used in the boxed-beef market, partly because standardization is not as well defined for boxed-beef products as for carcass beef. Different cutting procedures and trim specifications are used by various suppliers, making it more difficult to interpret price reports which vary by greater amounts and frequencies than carcass prices.

Retail. Unlike the active and volatile exchange systems for cattle and wholesale meat, prices in grocery stores and restaurants are set or administered by the selling firms. Many factors are taken into account when prices are set, including the wholesale cost of the beef, the firm's operating and

investment costs, price levels of competitive firms, and whether a special promotion or sale is in effect. Retail prices generally follow the direction of wholesale and live prices, but with a lag and with less volatility. Retailers bid up the price of wholesale beef when consumers are buying more beef relative to supply, and, conversely, wholesale prices tend to fall when retailers' orders are smaller than available supplies. This is the mechanism through which producers make production decisions in reaction to price, and consumers determine what the price will be by the rate at which they purchase beef.

MARKETING COSTS

The price spread for Choice beef is the difference between the value of the product at two market levels. The average retail Choice beef price is compared with the average value of an equivalent quantity of retail cuts at the carcass and live animal levels. It takes 2.4 pounds of live animal and 1.476 pounds of carcass to produce 1 pound of retail cuts, because of the removal of hide, fat, bone, and other offal. The value of byproducts not sold as meat cuts (such as hides, feet, and offal) is deducted from gross value to obtain net farm (live animal) and net carcass values. In 1982, the average retail store price for Choice beef was 242 cents per pound, the net carcass value was 151 cents per pound, and the net farm value was 140 cents per retail pound. The farm-carcass spread was 10.2 cents and the carcass-retail spread was 91.8 cents per pound, for a total price spread of 102 cents per retail pound. The farmers' share of each dollar spent for Choice beef was 58 percent, slightly less than in the three previous years and the same as in 1977. This is a relatively high percentage compared to many other foods. The average farm share for all farm foods in 1982 was 35 percent.

The price spread reflects the costs and profits involved in performing marketing functions from the farm to the retail food store. The costs in 1982 were (4):

	Cents per retail lb.
o slaughtering	6.8
o intercity transportation	3.8
o warehousing and store delivery	15.2
o breaking of carcass	11.0
o cutting and merchandising	65.6

While the price spread reflects increases in the costs of moving beef from the farm to the retail store, other marketing costs have also increased. More beef is now eaten in restaurants and institutions, increasing the total services

involved in preparing and serving beef to consumers. Beef today is better packaged, includes more cutting and tenderizing, and is usually fresher than 20 years ago.

PUBLIC POLICY

Other than general price controls in the early seventies, there have been no direct government quantity or price programs in effect for beef, but government policies do affect the beef subsector.

The beef industry is affected indirectly by feed grain programs as they change the quantity and price of feed grains. The rules regarding grazing, or harvesting roughage from acres taken out of crop production can also be important to cattle producers.

A wide range of Federal activities pertain to the beef industry. Regulations concerning food and feed additives, food labeling, meat inspection, import quotas, animal diseases, and business practices form one important category. Facilitating functions such as price reporting, livestock and meat grading, and collecting and reporting statistics are another. A third category is basic biological and economic research, outside research support, and educational programs.

FOREIGN TRADE

About 8 percent of the beef and about 4 percent of the veal consumed in the United States in 1982 was imported (14). Mostly hamburger-type beef was imported from Australia and New Zealand.

The amount imported is limited by quotas. The U.S. Meat Import Act of 1979 changed the manner in which quotas for imported meat are established. Quotas formerly rose and fell along with U.S. production cycles. The 1979 Act was designed to set import quotas proportionally higher when U.S. production is in the low portion of the cycle and lower when U.S. production is cyclically high. The new bill is therefore termed countercyclical.

The United States also exports animals and animal products to other countries. Variety meats and byproducts such as tallow and hides are the most important components of exports. Their export value largely offsets the value of imported meats. In 1982 animal and meat imports were valued at $2.64 billion while exports were valued at $2.425 billion (table 4).

PERFORMANCE

The performance of a large and diverse subsector cannot be measured with precision, but some measures can be considered. Output per hour of labor has increased for meat animals along with the rest of agriculture. Between 1967 and 1980, total farm output per hour increased 96 percent, crops 86 percent, meat animals 118 percent, and poultry 191 percent (11). Labor productivity in food manufacturing increased 29 percent from 1967 to 1979; in meat packing and processing 35 percent (5). These figures compare favorably with the nonfarm business sector of the economy, which experienced only a 17-percent increase from 1967 to 1979 (5). Foodstores and eating and drinking places increased in labor productivity

Table 4--Value of U.S. imports and exports of meat animals, meat, and meat products

Commodity	Imports		Exports	
	1981	1982 1/	1981	1982 1/
	Million dollars			
Live animals:				
Cattle and calves	191.1	297.7	65.6	50.1
Hogs	18.9	41.9	9.1	13.9
Sheep and lambs	.4	.6	9.1	10.6
Meat:				
Beef and veal	1,407.6	1,363.8	300.0	373.2
Pork	493.9	602.2	253.0	188.5
Lamb, mutton, and goat	37.6	25.7	2.8	2.3
Processed meat 2/	26.68	25.0	24.5	23.2
Tallow, grease, and lard	1.5	2.2	742.6	638.4
Variety meats	5.4	4.0	306.8	306.4
Casings	55.8	48.7	20.0	19.3
Hides and skins	100.7	70.7	691.0	769.1
Wool and mohair	147.0	122.2	31.3	29.6
Total	2,486.5	2,640.7	2,405.3	2,424.6

1/ Preliminary.
2/ Includes sausage, canned meats, and canned specialties.

Source:(14).

between 1967 and 1973, but suffered declines in output per unit of labor after 1973 (5).

Between 1950 and 1970, beef and veal production per cow increased from 265 pounds to 436 pounds or 65 percent; most of this increase was due to the increasing proportion of steers and heifers finished on high-energy feeds during that period. Output per cow remained at 436 pounds in 1975 and 1980 (5). The number of calves raised per cow varies from year to year depending upon the weather and the phase of the cattle cycle. The average has changed little over the last three cattle cycles.

Cattle raisers and feeders alternate profitable and unprofitable periods through the cattle cycle. Profits were poor to negative for both cattle raisers and cattle feeders between 1975 and 1981, because of herd liquidation, large supplies of competing meats, and a sluggish economy (table 5).

Packers' profits are less affected by the cycle. Meat packing has been a relatively low-profit industry. The American Meat Institute reports average beef packer profits for 1981 of 0.6 percent of sales and 10.7 percent of net worth. In 1980, food manufacturing averaged 13.25 percent and all manufacturing 13.33 percent of net worth (1).

The area of poorest performance in the cattle-beef subsector may be coordination. Cattle are often transported several times, may be fed for too long or too short a period, sold at the wrong time, and inaccurately priced. The largest symptom of coordination problems is the cattle cycle which has inevitably brought alternate periods of boom and bust to cattlemen. The cattle-beef subsector has been effective in adapting new technology and management practices as they become available. Perhaps the greatest opportunities for improved performance lie in the categories of short- and longrun coordination among firms and stages of the subsector. Coordinating output over the long run could help all stages of the industry.

Other improvements could be made in coordinating the genetic type, feeding regime, ration makeup, and marketing mechanism in a way that gives increased consideration to the needs of firms and consumers at other stages of the vertical chain.

Much information about livestock, such as the breeding history, age, previous feeds fed, length of breeding period, and medications administered, is lost when cattle change owners. This may cause cattle to be treated as average when special management might be appropriate to avoid duplication of medicines, and over- or underfeeding. Cattlemen are seldom aware of the ultimate cutability and quality of the cattle they sell, making it difficult for them to know if adjustments in breeding or feeding are needed. New technologies in information storage, communication, and retrieval make such improvements in coordination technically possible.

Table 5--Costs and returns of U.S. cow-calf and cattle feeding enterprises, 1980-82

Enterprise	1980	1981	1982
	Dollars per cow		
Cow calf (all sizes, all regions):			
Cash receipts	306.91	260.64	255.49
Cash expenses	226.23	251.25	255.12
Receipts less cash expenses	80.68	9.39	.37
Capital replacement	54.19	59.22	61.69
Receipts less cash expenses and replacement 1/	26.49	-49.83	-61.32
	Dollars per cwt.		
Cattle feeding (all sizes, all regions):			
Cash receipts	66.20	63.41	63.62
Cash expenses	69.66	68.65	62.38
Receipts less cash expenses	-3.46	-5.24	1.24
Capital replacement	1.12	1.23	1.25
Receipts less cash expenses and replacement 1/	-4.58	-6.47	-.01

1/ Non-cash costs, such as imputed interest on owned capital or unpaid family labor, are excluded from cost estimates.

Source: U.S. Department of Agriculture, Economic Research Service, Economic Indicators of the Farm Sector: Costs of Production, 1982. National Economics Division, ECIFS 2-3, December 1983.

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